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# FUZZY LOGIC-BASED ARRIVAL TIME ESTIMATION FOR INDOOR NAVIGATION USING AUGMENTED REALITY

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## Abstract

In recent years, Augmented Reality (AR) has gained popularity in various industries due to its ability to enhance efficiency, provide real-time information and data, and maintain user awareness of their surroundings. One of the applications of AR is in navigation, but most existing systems primarily focus on outdoor environments, neglecting indoor spaces. Mobile applications designed for indoor navigation often rely on expensive and computationally demanding beacons or natural markers to track the user's location along a predetermined path. Furthermore, traditional navigation estimation methods based on GPS are ineffective for indoor navigation. This study proposes a mobile AR application for indoor navigation that uses an intelligent signage algorithm based on fuzzy logic to

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estimate arrival time. The algorithm takes phone acceleration in the x and z directions as inputs and employs triangular-shaped membership functions for input and output variables. The experimental results indicate the feasibility of using fuzzy logic to estimate arrival time for indoor navigation, with an average prediction error of 5.82%. © (2025), (International Islamic University Malaysia). All rights reserved.

## Author keywords

Estimated Time Arrival; Fuzzy Logic; Indoor Navigation; Path Planning

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## References (14)

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- 1 (2020) *Statistics On Fire Breakouts, Statistics On Fire Breakouts, Malaysia - Dataset - MAMPU*  
Department of Statistics Malaysia. Retrieved from  
[https://www.data.gov.my/data/en\\_US/dataset/statistics-on-fire-breakouts-malaysia](https://www.data.gov.my/data/en_US/dataset/statistics-on-fire-breakouts-malaysia)

- 2 Bahamid, A., Ibrahim, A.M., Ibrahim, A., Zahurin, I.Z., Wahid, A.N.  
**Intelligent robot-assisted evacuation: A review**  
  
(2020) *Journal of Physics: Conference Series*, 1706 (1), art. no. 012159. Cited 13 times.  
<http://iopscience.iop.org/journal/1742-6596>  
doi: 10.1088/1742-6596/1706/1/012159  
  
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- 3 Abir, I.M., Mohd Ibrahim, A., Toha, S.F., Shafie, A.A.  
**A review on the hospital evacuation simulation models**  
  
(2022) *International Journal of Disaster Risk Reduction*, 77, art. no. 103083. Cited 19 times.  
<http://www.journals.elsevier.com/international-journal-of-disaster-risk-reduction/>  
doi: 10.1016/j.ijdr.2022.103083  
  
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- 4 Ibrahim, A.M., Saifullah, M., Romlay, M.R.M., Venkat, I., Ibrahim, I.  
**Hybrid Social Force-Fuzzy Logic Evacuation Simulation Model for Multiple Exits**  
  
(2019) *2019 7th International Conference on Mechatronics Engineering, ICOM 2019*, art. no. 8952063. Cited 6 times.  
<http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8947451>  
ISBN: 978-172812971-6  
doi: 10.1109/ICOM47790.2019.8952063  
  
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- 5 Craig, A.B.  
Understanding augmented reality: Concepts and applications
- (2013) *Understanding Augmented Reality: Concepts and Applications*, pp. 1-272. Cited 292 times.  
<https://www.sciencedirect.com/book/9780240824086/understanding-augmented-reality>  
ISBN: 978-024082408-6  
doi: 10.1016/C2011-0-07249-6

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---

- 6 De Oliveira, L.C., Andrade, A.O., De Oliveira, E.C., Soares, A., Cardoso, A., Lamounier, E.  
Indoor navigation with mobile augmented reality and beacon technology for wheelchair users
- (2017) *2017 IEEE EMBS International Conference on Biomedical and Health Informatics, BHI 2017*, art. no. 7897199, pp. 37-40. Cited 31 times.  
ISBN: 978-150904179-4  
doi: 10.1109/BHI.2017.7897199

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---

- 7 Huang, B.-C., Hsu, J., Chu, E.T.-H., Wu, H.-M.  
Arbin: Augmented reality based indoor navigation system  
([Open Access](#))
- (2020) *Sensors (Switzerland)*, 20 (20), art. no. 5890, pp. 1-20. Cited 49 times.  
<https://www.mdpi.com/1424-8220/20/20/5890/pdf>  
doi: 10.3390/s20205890

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---

- 8 Matuszka, T., Gombos, G., Kiss, A.  
A new approach for indoor navigation using semantic webtechnologies and augmented reality ([Open Access](#))
- (2013) *Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 8021 LNCS (PART 1), pp. 202-210. Cited 30 times.  
<https://www.springer.com/series/558>  
ISBN: 978-364239404-1  
doi: 10.1007/978-3-642-39405-8\_24

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---

- 9 Valvo, A.L., Croce, D., Garlisi, D., Giuliano, F., Giarré, L., Tinnirello, I.  
A navigation and augmented reality system for visually impaired people ([Open Access](#))
- (2021) *Sensors*, 21 (9), art. no. 3061. Cited 32 times.  
<https://www.mdpi.com/1424-8220/21/9/3061/pdf>  
doi: 10.3390/s21093061

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□ 10 Md Noor, R., Seong Yik, N., Kolandaisamy, R., Ahmedy, I., Hossain, M. A., Lim, K., Yau, A., (...), Nandy, T.  
(2020) *Predict Arrival Time By Using Machine Learning Algorithm To Promote Utilization of Urban Smart Bus*. Cited 12 times.  
[10] February  
<https://doi.org/10.20944/preprints202002.0197.v1>

---

□ 11 Liu, Z., Chen, L., Zhou, X., Jiao, Z., Guo, G., Chen, R.  
(2023) *Machine Learning for Time-of-Arrival Estimation with 5G Signals in Indoor Positioning*, 14 (8).  
[11]  
<https://doi.org/10.1109/JIOT.2023.3234123>

---

□ 12 Bhorkar, G.  
(2017) *A Survey of Augmented Reality Navigation*. Cited 20 times.  
[12] Retrieved  
[fromhttp://arxiv.org/abs/1708.05006](http://arxiv.org/abs/1708.05006)

---

□ 13 Koch, C., Neges, M., König, M., Abramovici, M.  
**Natural markers for augmented reality-based indoor navigation and facility maintenance (Open Access)**  
  
(2014) *Automation in Construction*, 48, pp. 18-30. Cited 145 times.  
doi: 10.1016/j.autcon.2014.08.009  
  
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---

□ 14 Romlay, M.R.M., Rashid, M.M., Toha, S.F., Ibrahim, A.M.  
**Rainfall-runoff model based on ANN with LM, BR and PSO as learning algorithms (Open Access)**  
  
(2019) *International Journal of Recent Technology and Engineering*, 8 (3), pp. 971-979. Cited 9 times.  
<https://www.ijrte.org/wp-content/uploads/papers/v8i3/C4115098319.pdf>  
doi: 10.35940/ijrte.C4115.098319  
  
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